

**REMARKS**

The Examiner's attention is also directed to recall the interview conducted April 19, 2005. During the interview it was concluded that the Examiner did not address the arguments and comments raised by the Applicants regarding the Fu and Iwashita references during the January 18, 2005 interview. Applicants therefore present, those arguments herein.

**Claim Disposition**

Claims 1, 2, 4, 6-10, 12, 14-19, 21, 23-27, 29 and 31-33 stand rejected. Claims 3, 5, 11, 13, 20, 22, 28 and 30 stand objected to as being dependent upon a rejected base claim.

**Allowable Subject Matter**

Claims 3, 5, 11, 13, 20, 22, 28 and 30 stand objected to as being dependent upon a rejected base claim, but have been indicated as allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants appreciate the Examiner's indication of the allowability of these claims.

**Claim Rejections - 35 USC § 103**

Claims 1, 2, 4, 6-10, 12, 14-19, 21, 23-27, 29 and 31-33 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Fu U.S. Patent No. 5,361,210, hereinafter referred to as Fu, in view of Iwashita U.S. Patent No. 5,726,545 hereinafter referred to as Iwashita. Applicants respectfully traverse. The Examiner in the Office Action states:

"Regarding claims 1, 9, 18 and 26, Fu discloses detecting a rotational position of current an electric machine with a position encoder coupled to the electric machine (column 3 lines 31-34), controlling an inverter comprising a plurality of switching devices. (column 4 lines 26-28), the inverter (10) having an input coupled to a direct current bus, and an output coupled to a polyphase bus, the inverter responsive to commands from a controller coupled to the inverter and the position encoder (Fig. 1,

element 1) and measuring a current from the direct current bus (column 4 lines 39-54). Fu does not disclose capturing the current at a predefined interval of time. Iwashita et al. disclose a current control method for a motor including detecting a rotational position of an electric machine with a position encoder (25) coupled to the electric machine (column 7 lines 12-23, Fig. 8), an inverter (23) and capturing the current at a predefined interval of time (column 5 lines 35-37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include capturing the current at a predefined interval of time as taught by Iwashita et al. into Fu for the purpose of correcting current measurements to provide accurate control of an electric machine such as a motor."

"Regarding claims 2, 10, 19 and 27, Fu disclose determining a set of values representative of a magnitude of currents on each phase of the polyphase buss (column 4 lines 39-54)."

"Regarding claims 4, 12, 21 and 29, Fu discloses determining a value representative of a torque current from the current (column 2 lines 65-69)."

"Regarding claims 6, 7, 14, 15, 23, 24, 31 and 32, Fu discloses an encoder for position sensing (column 3 lines 31-34) and a permanent magnet motor/DC brushless motor/direct drive motor (column 3 lines 10-14)."

"Regarding claims 8, 17, 25 and 33, Fu disclose capturing is characterized by sampling a signal value representative of the current (column 4 lines 39-41)."

"Regarding claim 16, Fu discloses the inverter comprised of switching devices coupled to and responsive to the controller (column 4 lines 26-28)."

Applicants respectfully disagree. For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness. *In re Fine*, U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). The Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

With regard to Claims 1, 9, 18 and 26, Applicants respectfully contend that neither Fu nor Iwashita, whether alone or in combination disclose or teach each element of the

invention. Specifically, neither Fu nor Iwashita teach or disclose, “measuring a current *from said direct current bus*; and/or “*capturing said current at a predefined interval of time*”. While Fu includes current sensing, it provides no teaching regarding capturing the current a predefined interval of time as the Applicants have described and claimed. Furthermore, to support the rejection in this regard, the Examiner relies on the teachings of Iwashita at Col. 5 lines 35-37, as allegedly teaching “capturing said current at a predefined interval of time. Applicants respectfully disagree. Col 5, lines 35 – 37 includes no such teaching and in fact, refers to establishing a correct measurement of the delay time  $\delta$ , based on the two time periods (delays) enumerated and based on making a measurement. The first delay period being the time between when the voltage command is outputted versus when it is actually applied to the windings. The second delay time being the time period for detecting the actual current. This time is defined as the time between when the current actually flows in the winding to the time when current is read by the software. One skilled in the art would readily appreciate that the time periods enumerated by Iwashita are those, which are commonplace for any signal generated or read by a controller. That is, the delay between making command and the actual command; and the time between actual value and the measurement of that value. This is not at all what the Applicants have disclosed or claimed. Applicants’ claims specifically require “*capturing said current at a predefined interval of time*” In other words, performing the sampling at a particular instance or interval. Conversely, the teachings of Iwashita merely identify the delays associated with making a command and measurement. This disclosure is not at all equivalent to that which the Applicants have claimed. Therefore, because neither Fu nor Iwashita teach or disclose an element of the claimed invention they cannot anticipate Applicants’ claims. Thus, Claims 1, 9, 18, and 26 are allowable, the rejections are improper and they should be withdrawn.

Moreover, in view of the above discussion, Claims 2, 4, 6 – 10, 12, 14 - 19, 21, 23 – 27, 29, 31 – 33 depend from Claims 1, 9, 18, and 26 respectively, whether directly or indirectly, and include all of the corresponding limitations thereof. Claims 1, 9, 18, and 26 are not taught by either Fu or Iwashita, whether alone or in combination, therefore, Claims 2, 4, 6 – 10, 12, 14 - 19, 21, 23 – 27, 29, 31 – 33 cannot be taught by Fu or Iwashita either. Thus, Claims 2, 4, 6 – 10, 12, 14 - 19, 21, 23 – 27, 29, 31 – 33 are allowable, the rejections are improper and they should be withdrawn. MPEP 2143.03

Alternatively, and significantly, considering hypothetically that the suggested combination is made, and that the Examiner's suggestions regarding what is allegedly disclosed by the references is considered despite the arguments presented above, the proposed combination would still not be sufficient to render Applicants' claims unpatentable. For an obviousness rejection to be proper, *In re Fine* specifically requires that the Examiner must meet the burden of establishing the suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references. Furthermore, the Examiner must meet the burden of establishing ... that the proposed modification of the prior art must have had a reasonable expectation of success. MPEP 2143.02. Moreover, the suggested modification cannot change the principle of operation of a reference. MPEP 2143.01. The combination of references as suggested in the Office Action cannot satisfy these requirements. There is no motivation or suggestion to make the suggested combination of Fu and Iwashita for numerous reasons.

First, Applicants respectfully maintain that the Examiner has used an improper standard in arriving at the rejection of the above claims under §103, which fails to consider the totality of Applicant's invention and to the totality of the cited references. More specifically the Examiner has used Applicant's disclosure to select portions of the cited references to allegedly arrive at Applicant's invention. In doing so, the Examiner has failed to consider the teachings of the references or Applicant's invention as a whole in contravention of §103.

In particular, the Examiner has provided insufficient explanation for the motivation to make the suggested combination, nor has the Examiner identified where in the cited references or the art teaching of such motivation may be found. *In re Fine* specifically requires that the Examiner must meet the burden of establishing the suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references. The explanation in the Office Action provides that one skilled in the art would include "capturing the current at a predefined interval of time as taught by Iwashita et al. into Fu for the purpose of correcting current measurements to provide accurate control of an electric machine such as a motor". There is no specific teaching in the totality of the art including the cited references as suggested by the Examiner, that would motivate one skilled in the art to make the suggested combination of the motor controls system of Fu and the motor control system of Iwashita to allegedly arrive at the Applicants' invention. In fact, there is significant teaching away from such a combination. Iwashita is specifically directed at current mode control and conversion of the current to the d and q axes to facilitate

elimination of the delays in the current control loop. Fu is also directed to current mode control and specifically identifies the complications resulting from the existing methods based on performing d-q transformations. See Fu at Col 1, lines 63 – 68. Conversely, the claimed invention is directed to detecting and estimating phase currents while employing voltage mode control.

Second, there is no motivation to combine the references and make the suggested modifications because to do so would require a change in the principles of operation of one or both references. In particular, Fu specifically teaches employing the bus current as measured by the current detecting circuit 12, while Iwashita specifically teaches and in fact, requires the use of the three phase currents and phase current measurements. Furthermore, as mentioned above, both employ current mode control, while the Applicants' invention is based on voltage mode control. Therefore, to employ the current sense of Fu with that of Iwashita would change the principles of operation of both references in contravention of §103.

Therefore, because there is clear teaching away from the suggested combination and because the suggested combination would not exhibit a reasonable expectation of success and would change the principles of operation of both references there is no suggestion or motivation to combine/modify the references. Because there is no motivation to combine Fu with Iwashita as suggested they cannot render the Applicants' claims unpatentable. Thus, Claims 1, 9, 18, and 26 are allowable, the rejections are improper, and they should be withdrawn. Similarly, because claims 2, 4, 6 – 10, 12, 14 – 19, 21, 23 – 27, 29, 31 – 33 depend from claims 1, 9, 18, and 26 respectively, claims 2, 4, 6 – 10, 12, 14 – 19, 21, 23 – 27, 29, 31 – 33 are allowable, the rejections of these claims are improper and they should be withdrawn.

The arguments here presented are made for the purposes of better defining the invention, rather than to overcome the rejections for patentability. The claims were not amended to overcome the prior art and therefore, no presumption should attach that either the claims have been narrowed over those earlier presented, or that subject matter or equivalents thereof to which the Applicants are entitled has been surrendered.

It is believed that the foregoing remarks are fully responsive to the Office Action and that the claims herein should now be allowable to the Applicants. In the event the Examiner has any queries regarding the instantly submitted response, the courtesy of a telephone conference to discuss any matters in need of attention is respectfully requested.

If there are any additional charges with respect to this Response or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully Submitted,

CANTOR COLBURN LLP

By



Troy J. LaMontagne

Registration No. 47,239

55 Griffin Road South

Bloomfield, CT 06002

Telephone: (860) 286-2929

Customer No. 23413

Date: April 21, 2005